

## Appendix

**Table A. Baseline and Proposed Models IoU Perfornce Across Individual Object Class**

Class	Name	Ratio	Baseline	Model 1	Model 2	Model 3
0	background	7.25%	0.1349	0.149	0.1472	<b>0.1626</b>
1	wall	15.76%	0.4735	0.5312	0.5442	<b>0.5535</b>
2	building, edifice	10.72%	0.5668	<b>0.5936</b>	0.5283	0.5171
3	sky	8.78%	0.8541	<b>0.8584</b>	0.8474	0.8227
4	floor, flooring	6.21%	0.5354	0.5641	<b>0.5759</b>	0.5655
5	tree	4.80%	0.5031	0.5289	0.4307	<b>0.5493</b>
6	ceiling	4.50%	0.6372	0.6523	0.6105	<b>0.6557</b>
7	road, route	3.98%	0.5265	<b>0.5272</b>	0.2836	0.4864
8	bed	2.31%	0.4941	0.5536	<b>0.619</b>	0.6042
9	windowpane, window	1.98%	0.3623	0.3904	<b>0.451</b>	0.3986
10	grass	1.83%	0.3987	<b>0.4603</b>	0.4407	0.4562
11	cabinet	1.81%	0.1476	0.1894	0.1771	<b>0.2246</b>
12	sidewalk, pavement	1.66%	0.1127	<b>0.1227</b>	0.0102	0.03
13	person, individual, someone, somebody, mortal, soul	1.60%	0.2891	<b>0.405</b>	0.3689	0.3871
14	earth, ground	1.51%	0.0894	0.1452	0.1221	<b>0.1723</b>
15	door, double door	1.18%	0.0087	0.0187	0.0286	<b>0.0983</b>
16	table	1.10%	0.1548	0.1836	0.182	<b>0.2149</b>
17	mountain, mount	1.09%	0.2531	<b>0.2857</b>	0.0624	0.2522
18	plant, flora, plant life	1.04%	0.1412	0.2305	0.1075	<b>0.3011</b>
19	curtain, drape, drapery, mantle, pall	1.04%	0.2623	0.3368	<b>0.4165</b>	0.3474
20	chair	1.03%	0.153	0.1946	0.1249	<b>0.2501</b>
21	car, auto, automobile, machine, motorcar	0.98%	0.3181	<b>0.3534</b>	0.1071	0.1714
22	water	0.74%	0.0225	<b>0.1549</b>	0.0027	0.1527
23	painting, picture	0.67%	0.3427	0.3303	0.4222	<b>0.4241</b>
24	sofa, couch, lounge	0.65%	0.024	0.0423	0.0724	<b>0.128</b>
25	shelf	0.61%	0.0015	0.0408	0.0012	<b>0.0869</b>
26	house	0.60%	0	0	0	<b>0.1514</b>
27	sea	0.53%	0.1755	0.2541	0.0642	<b>0.3065</b>

28	mirror	0.52%	0.0325	0.0692	<b>0.1086</b>	0.1017
29	rug, carpet, carpeting	0.46%	0.0837	0.0206	0.0368	<b>0.2323</b>
30	field	0.44%	<b>0.1636</b>	0.1593	0.0003	0.0303
31	armchair	0.44%	0	0.0003	<b>0.0278</b>	0.0091
32	seat	0.44%	0.0003	<b>0.0254</b>	0.0004	0.0132
33	fence, fencing	0.33%	0	0	0	0
34	desk	0.31%	0	0	0	<b>0.0045</b>
35	rock, stone	0.30%	0.0001	<b>0.0303</b>	0	0.0024
36	wardrobe, closet, press	0.27%	0.0566	0.0456	<b>0.1782</b>	0.0823
37	lamp	0.26%	0.1113	0.1945	<b>0.3229</b>	0.247
38	bath tub, bathing tub, bath, tub	0.24%	0.1259	0.063	0.1666	<b>0.2031</b>
39	railing, rail	0.24%	0	0	0	0
40	cushion	0.23%	0.0677	0.099	0.1213	<b>0.1583</b>
41	base, pedestal, stand	0.23%	0	0	0	0
42	box	0.22%	0	0	0	0
43	column, pillar	0.22%	0	0	0	0
44	signboard, sign	0.20%	0.0091	0.0045	0.0203	<b>0.0395</b>
45	chest of drawers, chest, bureau, dresser	0.19%	0.0057	<b>0.1908</b>	0.1061	0.1645
46	counter	0.19%	0	0	0	0
47	sand	0.18%	0.0489	0.0483	<b>0.1243</b>	0.1176
48	sink	0.18%	0.1418	0.1894	<b>0.2669</b>	0.1997
49	skyscraper	0.18%	0	0	0	0
50	fireplace, hearth, open fireplace	0.18%	0.1591	0.0292	<b>0.1663</b>	0.0208
51	refrigerator, icebox	0.18%	0	0	0	0
52	grandstand, covered stand	0.18%	0	0	0	0
53	path	0.18%	0	0	0	0
54	stairs, steps	0.17%	0	0	0	<b>0.0002</b>
55	runway	0.17%	0	0.0003	0.0025	<b>0.01</b>
56	case, display case, showcase, vitrine	0.17%	0	0	0	<b>0.0001</b>
57	pool table, billiard table, snooker table	0.17%	0	0	0	0
58	pillow	0.17%	0.2472	0.2499	0.0747	<b>0.2547</b>
59	screen door, screen	0.15%	0	0	0	0

60	stairway, staircase	0.15%	0	<b>0.0012</b>	0	0
61	river	0.15%	0	0	0	0
62	bridge, span	0.15%	0	0	<b>0.04</b>	0
63	bookcase	0.14%	0	<b>0.0269</b>	0.0192	0.0017
64	blind, screen	0.14%	0	<b>0.0032</b>	0	0
65	coffee table, cocktail table	0.14%	0	0	0.0001	<b>0.0709</b>
66	toilet, can, commode, crapper, pot, potty, stool, throne	0.14%	0.2191	0.1332	0.355	<b>0.4202</b>
67	flower	0.14%	0.0188	<b>0.1205</b>	0.0915	0.03
68	book	0.13%	0.0054	<b>0.0743</b>	0	0.0017
69	hill	0.13%	0	0	<b>0.1128</b>	0
70	bench	0.13%	0	0	0	0
71	countertop	0.12%	0.0416	0.0754	0.0926	<b>0.0969</b>
72	stove, kitchen stove, range, kitchen range, cooking stove	0.12%	0	0	0	0
73	palm, palm tree	0.12%	0	<b>0.0001</b>	0	0
74	kitchen island	0.12%	0	0	0	0
75	computer, computing machine, computing device, data processor, electronic computer, information processing system	0.11%	0	0	0	<b>0.0069</b>
76	swivel chair	0.10%	0	<b>0.009</b>	0	0.0001
77	boat	0.09%	0	0	0	0
78	bar	0.09%	0	0	0	0
79	arcade machine	0.09%	0	0	0	0
80	hovel, hut, hutch, shack, shanty	0.09%	0	0	0	0
81	bus, autobus, coach, charabanc, double-decker, jitney, motorbus, motorcoach, omnibus, passenger vehicle	0.09%	0	0	0	0
82	towel	0.08%	0	<b>0.001</b>	0	0
83	light, light source	0.08%	<b>0.194</b>	0.1929	0.1242	0.1138
84	truck, motortruck	0.08%	0	0	0	0
85	tower	0.08%	0	0	0	0
86	chandelier, pendant, pendent	0.08%	0.1047	0.1524	0.0441	<b>0.2453</b>

87	awning, sunshade, sunblind	0.07%	0	0	0	0
88	streetlight, street lamp	0.07%	0	<b>0.006</b>	0	0
89	booth, cubicle, stall, kiosk	0.07%	0	0	0	0
90	television receiver, television, television set, tv, tv set, idiot box, boob tube, telly, goggle box	0.07%	0.0002	0.1461	0.0389	<b>0.3089</b>
91	airplane, aeroplane, plane	0.07%	0	0	0	0
92	dirt track	0.07%	0	0	0	0
93	apparel, wearing apparel, dress, clothes	0.07%	0	0	0	<b>0.0168</b>
94	pole	0.06%	0	0	0	0
95	land, ground, soil	0.06%	0	0	0	0
96	bannister, banister, balustrade, balusters, handrail	0.06%	0	0	0	0
97	escalator, moving staircase, moving stairway	0.06%	0	0	0	0
98	ottoman, pouf, pouffe, puff, hassock	0.06%	0	0	<b>0.0376</b>	0
99	bottle	0.06%	0	0	0	0
100	buffet, counter, sideboard	0.06%	0	<b>0.0005</b>	0	0
101	poster, posting, placard, notice, bill, card	0.06%	0	0	0	0
102	stage	0.06%	0	0	0	0
103	van	0.06%	0	0	0	0
104	ship	0.06%	0	0	0	0
105	fountain	0.05%	0	0	0	0
106	conveyer belt, conveyor belt, conveyer, conveyor, transporter	0.05%	0	0	0	0
107	canopy	0.05%	0	0	0	0
108	washer, automatic washer, washing machine	0.05%	0	0	0	0
109	plaything, toy	0.05%	0	0	0	0
110	swimming pool, swimming bath, natatorium	0.05%	0	0	0	0
111	stool	0.05%	0	0	0	0
112	barrel, cask	0.05%	0	0	0	0

113	basket, handbasket	0.05%	0	0	0	0
114	waterfall, falls	0.05%	0	0	0	0
115	tent, collapsible shelter	0.05%	0	0	0	0
116	bag	0.05%	0	0	0	0
117	minibike, motorbike	0.05%	0	0	0	0
118	cradle	0.05%	0	0	0	0
119	oven	0.05%	0	0	0	0
120	ball	0.05%	0.0843	<b>0.279</b>	0.1011	0.0054
121	food, solid food	0.05%	0	0	0	0
122	step, stair	0.04%	0	0	0	0
123	tank, storage tank	0.04%	0	0	0	0
124	trade name, brand name, brand, marque	0.04%	0	0	0	0
125	microwave, microwave oven	0.04%	0	0	0	0
126	pot, flowerpot	0.04%	0	0	0	0
127	animal, animate being, beast, brute, creature, fauna	0.04%	0	0	0	0
128	bicycle, bike, wheel, cycle	0.04%	0	0	0	0
129	lake	0.04%	0	0	0	0
130	dishwasher, dish washer, dishwashing machine	0.04%	0	0	0	0
131	screen, silver screen, projection screen	0.04%	0	0.0308	0	<b>0.2163</b>
132	blanket, cover	0.04%	0	0	0	0
133	sculpture	0.04%	0	0	0	0
134	hood, exhaust hood	0.04%	0	0	0	0
135	sconce	0.03%	0	0	0	0
136	vase	0.03%	0	0	0	0
137	traffic light, traffic signal, stoplight	0.03%	0	0	0	0
138	tray	0.03%	0	0	0	0
139	ashcan, trash can, garbage can, wastebin, ash bin, ash-bin, ashbin, dustbin, trash barrel, trash bin	0.03%	0	0	0	0
140	fan	0.03%	<b>0.0589</b>	0.0287	0	0.0114
141	pier, wharf, wharfage, dock	0.03%	0	0	0	0

142	crt screen	0.03%	0	<b>0.0011</b>	0	0
143	plate	0.03%	0	0	0	0
144	monitor, monitoring device	0.03%	0	0	0	0
145	bulletin board, notice board	0.03%	0	0	0	0
146	shower	0.03%	0	0	0	0
147	radiator	0.03%	0	0	0	0
148	glass, drinking glass	0.02%	0	0	0	0
149	clock	0.02%	0	0	0	0
150	flag	0.02%	0	0	0	0